An Evidence-Based Approach for Establishing Dietary Guidelines

Janet C. King*

Children’s Hospital Oakland Research Institute, Oakland, CA 94609

Abstract

Although all agree that diet is important to health, for Americans, compliance with dietary guidelines is poor. This may be because socioeconomic, cultural, and political factors influencing food habits were given little consideration when the guidelines were derived. In 2005, the Dietary Guidelines Advisory Committee was advised to focus their analysis on scientific evidence linking diet and health. Although this approach strengthened the scientific rationale behind the guidelines, factors from the “real world” affecting compliance received little attention. The research base for the guidelines needs to be expanded to include studies of barriers to compliance as well as randomized controlled trials of whole diets. Also, the process for formulating the guidelines needs to be expanded to include input from the diverse group of users and stakeholders. Possibly, a 3-step process involving a technical analysis, user appraisal, and federal formulation, all coordinated by a Standing Dietary Guidelines Committee, would broaden assessment of relevant data and better integrate conflicting uses and applications. J. Nutr. 137: 480–483, 2007.

Few of us would dispute that diet is important to our health. The public receives dietary advice from a variety of sources on almost a daily basis. Some of that advice is good; some is less so. The U.S. government, as part of its national nutrition policy, releases dietary advice in the form of the Dietary Guidelines for Americans every 5 y. Although this advice has been remarkably consistent since the first set of Guidelines was released in 1980, compliance with the recommendations is poor. As few as 3–4% of Americans follow all of the Dietary Guidelines (DG).2 In a recent study, Reeves and Rafferty (1) used data from 164,940 adult participants in the 2000 National Behavioral Risk Factor Surveillance System to determine compliance with 4 healthy lifestyle characteristics: consuming 5 fruits and vegetables per day, regular physical activity, healthy weight, and not smoking. Only 3% of the U.S. adults surveyed followed all 4 modifiable lifestyle characteristics. Although three-quarters did not smoke, the prevalence of the other 3 lifestyle habits was low, between 22 and 40%. These findings illustrate that consistent publication of messages regarding diet, physical activity, and health has had a negligible impact on health behaviors.

Why are healthy lifestyle characteristics of Americans so suboptimal? One common explanation given is that the public is confused by the constant barrage of eating information and the conflicting messages. Another reason may be that the advice is not adequately individualized to address personal health concerns so, therefore, it is ignored. Also, failure to consider sociocultural influences on food habits in the recommendations may be another barrier to compliance. Tailoring public health messages may improve adherence by the general population.

Evidence-based public health concepts and dietary guidance

Evidence-based public health (EBPH) is a practice model that builds upon the success of evidence-based medicine (EBM) (2). EBPH is defined as the process of integrating science-based interventions with community preferences to improve the health of populations. As the case for EBM, EBPH systematically uses data, information, and scientific principles to enhance population health. The process can be delineated in 5 reiterative steps: 1) identify the problem, 2) assess the extent of the problem, 3) propose a solution(s), 4) implement program, and 5) assess compliance and impact. The process of establishing and implementing Dietary Guidelines for Americans follows these 5 steps (Table 1).

In 2005 the process for establishing the DG was modified. The Dietary Guidelines Advisory Committee (DGAC) was specifically charged by the Secretaries of the Department of Health and Human Services (HHS) and the USDA to make and submit a technical report that included recommendations for Dietary Guidelines and the rationale for these recommendations. The
Committee was told to focus its “recommendations on the supporting science rather than translating the recommendations into a communication document.” Thus, the DGAC was charged to complete the first 2 steps in the EBPH process: identify the problem or key question(s) (i.e., Is there a need for revising the dietary guidelines?) and assess the extent and strength of scientific evidence to support the revisions of the guidelines. These questions were then prioritized on the basis of perceived level of importance and availability of literature. The process was iterative; the wording of the research questions evolved, as did the need for additional questions.

Time did not permit a full evidence-based review of the strength behind each research question. However, a systematic review of peer-reviewed published literature, and other systematic reviews published by other agencies, such as the Institute of Medicine Dietary Reference Intakes, the World Health Organization, the Agency for Healthcare Research and Quality, and the International Agency for Research on Cancer, was done. A Scientific Review Subcommittee, formed to ensure that consistent reviews were used throughout the process, established “rules” for what evidence to consider. In vitro and animal studies, drug studies, and studies done before 1998 that had been reviewed by the 2000 DGAC were excluded.

Evidence from epidemiological, clinical trials, and observational studies in humans was the primary source of information. Knowledge of the effects of different diets on the incidence and prevalence of chronic diseases comes largely from epidemiological studies. Within that category, prospective (or cohort) epidemiological studies were rated more highly than cross-sectional or case-control studies. In prospective studies, diet assessment is done at an early stage, before the people have the disease, and then they are followed over time. In case-control or cross-sectional studies, diet analyses are conducted in people who currently have the disease and those who do not. This involves asking people to recall what they ate in the past, which has inherent difficulty in getting accurate information.

The “gold standard” for information on diet and health is the randomized controlled trial in which the subjects are randomly assigned to a diet intervention or control group, and total food intake is known. For dietary studies, these studies are not only very expensive, but they frequently focus on only 1 or 2 food groups, such as whole grains, or fruits and vegetables, making it difficult to apply the results to a comprehensive set of guidelines for a total diet. The Dietary Approach to Stop Hypertension (DASH) studies (3) was the only randomized feeding study available to the DGAC. The DASH Study evaluated the effects of 3 diets, a control diet, a fruits and vegetables diet, and the DASH diet, on 1 health outcome, blood pressure. The DASH diet emphasized fruits, vegetables, and low-fat dairy products; included whole grains, poultry, fish, and nuts; and was reduced in red meat, sweets, and beverages with added sugars. Among all participants, the DASH diet significantly lowered mean systolic blood pressure by 5.5 mm Hg and mean diastolic blood pressure by 3.0 mm Hg. The fruits and vegetables diet also significantly reduced blood pressure, but only about half as much as the DASH diet. Because the DASH diet was nearly identical to the food intake pattern developed by the 2005 DGAC and the USDA, the 2005 DGAC concluded that the new food intake pattern could be recommended to reduce the risk of chronic disease. However, the impact of this food intake pattern, which is also proposed in MyPyramid, on type 2 diabetes, cardiovascular disease, hypertension, osteoporosis, and cancer risk needs to be tested.

The evidence-based approach used by the DGAC for evaluating the strength of the evidence supporting each question was done systematically and provided a thorough, strong rationale behind the conclusive statements made for each question. But the strength of the evidence-based review was restricted by the limitations of the research base. The epidemiological studies provided hints at potential relations between diet and disease, but these hints need to be followed up with randomized controlled trials (RCTs). Except for the DASH Study, the RCTs available evaluated the impact of 1 food component on an aspect of health or disease. Also, to improve DG compliance, research needs to move beyond randomized trials. RCTs evaluate the efficacy of a clinical intervention where the causal chain between the agent (food) and the outcome (blood pressure, body weight, blood lipids, etc.) is relatively short and simple so that straightforward causality inferences can be drawn in a relatively short period of time (4). However, the causal chains in nutrition outcomes involve complex individual variability in the biological response, cultural influences on food habits, economic and geographic effects, and motivation to make behavioral changes. An understanding of the impact of those factors in a real-world setting on DG compliance is unknown. This is an urgent research need to improve compliance with the Dietary Guidelines.

Evidence-based dietary guidelines

<table>
<thead>
<tr>
<th>Step</th>
<th>Application to dietary guidelines</th>
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<tr>
<td>Identify problem</td>
<td>Dietary Guidelines Advisory Committee identified and ranked questions regarding diet and health</td>
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<tr>
<td>Assess extent</td>
<td>1) Conducted and tabulated findings from scientific literature searches, other evidence-based reports, and national surveys 2) Wrote conclusive statements summarizing the strength of the evidence relating diet and disease</td>
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<tr>
<td>Propose solution</td>
<td>HHS and USDA derived Dietary Guidelines for Americans based on the Advisory Committee technical review and informed opinions</td>
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<tr>
<td>Implement</td>
<td>1) HHS and USDA wrote a consumer bulletin summarizing the key recommendations in the full DG report 2) HHS wrote a handbook, A Healthier You 3) USDA further individualized the DG in MyPyramid</td>
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<tr>
<td>Assess impact</td>
<td>National surveys conducted by HHS and USDA on diet, health, and lifestyle behaviors of Americans</td>
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documents. The “policy document” translates practically all of the specific questions reviewed by the DGAC into recommendations and summarizes the technical evidence behind those recommendations (5). A total of 23 recommendations were made for the general population and 18 for special population groups, such as children, pregnant and lactating women, individuals over 50 y of age, and individuals with dark skin or limited exposure to sunlight. The Consumer Bulletin, also written by the USDA and HHS, emphasizes 3 major messages derived from the policy document: 1) make smart choices from every food group, 2) find your balance between food and physical activity, and 3) get the most nutrition out of your energy (www.healthierus.gov/dietaryguidelines). HHS published a handbook A Healthier You with detailed menus and recipes to assist the public in implementing the messages. The USDA subsequently released MyPyramid (www.Mypyramid.gov), an icon conveying 6 messages regarding a healthy diet: moderation, proportionality, variety, activity, gradual change, and personalization. Interactive tools, available through the web, help individualize the recommendations. The tracker on the Web allows an individual to develop his/her own food intake plan and guides successful implementation. Over a half-million Americans have registered with the tracker system since MyPyramid was released in April 2005.

The USDA and HHS also are responsible for assessing the impact of the Dietary Guidelines. Insufficient time has elapsed since the release of the 2005 DG to assess their impact. However, future national surveys of food habits (e.g., the Continuing Survey of Food Intake by Individuals, CSFII), food and lifestyle behaviors (e.g., the Behavioral Risk Factor Surveillance System, BRFSS), and health status (e.g., the National Health and Nutrition Examination Survey, NHANES) should provide useful information regarding their influence on food behaviors and health of Americans.

Suggestions for modifying the approach used to establish dietary guidelines

In 2005, the scientific review of relevant literature was separated from the process of deriving and implementing the DG. This was a major improvement in the process because it prevented the DGAC from debating how best to communicate the recommendations to the end users. Also, tensions regarding the economic impact and public health policies of any recommendations were removed from consideration when the technical analysis of the scientific evidence was conducted by the DGAC. Instead, the Committee did a thorough analysis of the scientific data without introducing potential bias regarding issues related to the agricultural and food-producing sectors, to U.S. nutrition policies and action programs or to the challenges of communicating the findings to the public. The DGAC was concerned, however, about the translation of the Guidelines into the current U.S. food policy and environment. Consequently, the Committee made the following statement in a letter to the Secretaries of HHS and USDA (5).

Major changes in the food habits and lifestyles of American are required to achieve these goals. The Committee recommends that your respective Departments, charged with the responsibility for the health and nutrition of the nation, initiate a national effort to reverse our escalating trend toward poor nourishment and health in a land of plenty. This requires many changes throughout our Society. Most specifically, we must explicitly address the extraordinary health disparities documented among our most economically disadvantaged in comparison to our most economically advantaged. Improved access to nutrient-rich foods at home, schools, work-places, and widespread education regarding the impact of individual choices are examples of changes we must effectuate.

Although the DGACs focus on a scientific review strengthens the rationale for each recommendation, the diverse uses of the Guidelines need to be assessed by the various stakeholders who are also using an evidence-based approach for dietary guidance. Currently, stakeholder input is limited to written or oral testimonies; there is no forum for discussing the tensions around nutrition policies that affect food production, marketing, health concerns, and consumer interests. Possibly, some of those tensions could be alleviated by instituting a 3-step process for establishing the Dietary Guidelines that is overseen by a Standing DG Committee composed of interested parties from government, academia, and the private sector (Fig. 1). A DG Technical Advisory Committee could be charged with providing the scientific rationale for a set of recommendations, a DG Users Committee could then review those recommendations and provide input to the Oversight Committee regarding their impact on food production, economics, trade and advertising issues, public health, and food behaviors, and a DG Committee composed of Federal employees would formulate a set of recommendations.

Broadening the diversity and input of stakeholders in establishing Dietary Guidelines should enhance the dialogue and analysis behind the recommendations. Clearly, there will always be differences of opinion regarding how to translate the scientific data into Guidelines because they are used in multiple ways by many different groups. Addressing differences of opinion during the process can only improve the acceptability and usefulness of the final product. Also, gaining widespread input will help tackle the tension between change and maintaining the status quo. For example, the DG food intake patterns are currently based on 6 commodity food groups: cereals, fruits, vegetables, dairy products, meat/fish/poultry/beans/nuts, and fats and oils. Yet, new technologies developed by the food industry are enhancing the health-promoting aspects of a wide variety of foods through fortification and genetics. This is blurring the boundaries among food groups, food components, individual foods, and dietary supplements. To address these changes, the food intake pattern system will need to be modified. This will not be easy because the commodity food groups have been the backbone of nutrition education in the United States since the 1920s (6).
The 6 editions of the DG published every 5 y since 1980 have largely been based on primary research on the biology relating diet and disease risk. Social, cultural, economic, and political influences on diet and health were considered minimally at best. Compliance with the Guidelines has been poor, and their impact is variable. This may be in part because of the failure to integrate experimental evidence with “real-life” situations. To improve the potential impact of future Guideline reports, the research base needs to be expanded to include studies identifying barriers to their impact. Also, a 3-step process involving the input of diverse stakeholders in formulating the Guidelines would increase the breadth and depth of the analysis and interpretation of information. A Standing DG Committee would ensure coordination across the various working groups and consistent progression of the Guidelines with research and societal changes in each edition.

**Literature Cited**